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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,058	09/06/2005	Christoph Brabec	21928-017US1	5861

26161 7590 04/15/2008
FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

MOWLA, GOLAM

ART UNIT	PAPER NUMBER
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4132

MAIL DATE	DELIVERY MODE
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04/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/525,058		BRABEC ET AL.	
	Examiner		Art Unit	
	Golam Mowla		4132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 02/18/2003, Prelim. Amd.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/09/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The abstract of the disclosure is objected to because it is too short. Correction is required. See MPEP § 608.01(b).
3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.

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(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.

(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.

(f) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said semiconductor layer" in line 3. There is insufficient antecedent basis for this limitation in the claim. It is suggested to insert --layer-- after "semiconductor" in line 2.

Claims 1 recites the limitation "said electrode" in line 3. There is insufficient antecedent basis for this limitation in the claim, since it is unclear as to which electrode Applicant is referring to. It is suggested said term be changed to "said positive electrode" or "said negative electrode". The same applies to dependent claims 2 and 3.

Claim 4 recites the limitation "the semiconductor layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is suggested said term be changed to "a semiconductor layer".

Claim 7 recites the limitation "the positive and negative electrodes" in line 5. There is insufficient antecedent basis for this limitation in the claim. It is suggested said term be changed to "the first and second electrodes".

Claim 16 recites the limitation "the positive and negative electrodes" in line 5. There is insufficient antecedent basis for this limitation in the claim. It is suggested said term be changed to "the first and second electrodes".

Claim 18 recites the limitation "the additional layer" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested said term be changed to "the first layer".

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-11, 14-16, and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujimori et al. (U.S. PG PUB 2002/0108649). Additional support is provided by Applicant's specification.

Regarding claim 1, Fujimori discloses an organic photovoltaic component (photoelectric conversion device comprising organic compound, see abstract)

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comprising a substrate (2, fig. 2, ¶ 0069), a positive electrode (first electrode 3, fig. 2, ¶ 0069), an organic semiconductor (hole transport layer 5, fig. 2; ¶ 0069, 0104, 0016, 0221, 0223) and a negative electrode (second electrode 6, fig. 2, ¶ 0069), wherein said substrate (2) and one additional transport layer (electron transport layer 4, fig. 2 and 3; ¶ 0069) between the electrode and semiconductor layer are structured (see fig. 2 that shows the bottom layer of the substrate is structured, and fig. 3 that shows that layer 4 is structured). First electrode 3 is made of ITO (¶ 0077). Positive electrode is made of ITO (Applicant's specification, page 2, ¶ 3). Therefore, second electrode 6 is inherently a negative electrode.

Regarding claim 2, Fujimori further discloses that said substrate (2) is a flexible sheet that is structured (¶ 0074).

Regarding claim 3, Fujimori further discloses that said substrate (2) below said semiconductor layer (5) is structured (see fig. 2 that shows the bottom layer of the substrate is structured).

Regarding claim 4, Fujimori discloses a method for structuring the semiconductor layer (hole transport layer 5, fig. 2, ¶ 0069, 0106, 0221, 0223) of a photovoltaic component (photoelectric conversion device, see abstract) by preserving an existing structure of a lower layer (electron transport layer 4, fig. 2 and 3) to which said semiconductor layer (5) is applied (see fig. 2).

Regarding claim 5, Fujimori further discloses that the semiconductor layer (5) planarizes (linearizes, fig. 2) the structure of lower layer (4).

Regarding claim 6, Fujimori further discloses that structuring is effected (becomes planarized from top down view, fig. 2) by introducing an additional layer (barrier layer 8, fig. 2, ¶ 0069).

Regarding claim 7, Fujimori discloses a photovoltaic cell, comprising:

- a substrate (2, fig. 2, ¶ 0069);
- a first electrode (first electrode 3, fig. 2, ¶ 0069) supported by the substrate (2);
- a second electrode (second electrode 6, fig. 2, ¶ 0069);
- an organic semiconductor (5) between the positive (3) and negative (6) electrodes,

wherein the substrate (2) is structured (see fig. 2).

Regarding claim 8, Fujimori further discloses that the substrate (2) is flexible (¶ 0074).

Regarding claim 9, Fujimori further discloses that the first electrode (3) is structured (*"The first electrode 3 is ...formed into a shape, for example, which has a plurality of comb teeth"*, ¶ 0081).

Regarding claim 10, Fujimori further discloses that the first electrode (3) is disposed on the substrate (2, see fig. 2).

Regarding claim 11, Fujimori further discloses that the first electrode (3) is made of ITO. Electrode made of ITO is a cathode (applicant's specification, page 2, ¶ 3).

Regarding claim 14, Fujimori further discloses that the photovoltaic cell further comprises a planarized layer (barrier layer 8, fig. 2, ¶ 0069; see also fig. 7 that explicitly shows the barrier layer is planarized).

Regarding claim 15, Fujimori further discloses that the first electrode (3) is disposed on the substrate (2, see fig. 2).

Regarding claim 16, Fujimori discloses a photovoltaic cell, comprising:

- a substrate (2, fig. 2, ¶ 0069);
- a first electrode (first electrode 3, fig. 2, ¶ 0069) supported by the substrate (2);
- a second electrode (second electrode 6, fig. 2, ¶ 0069);
- an organic semiconductor (4) between the positive (3) and negative (6) electrodes,

wherein the first electrode (3) is structured ("*The first electrode 3 is ...formed into a shape, for example, which has a plurality of comb teeth*", ¶ 0081).

Regarding claim 18, Fujimori further discloses that the photovoltaic cell further comprises a first layer (electron transport layer 4, fig. 2 and 3), the additional layer being structured (see fig. 2 and 3).

Regarding claim 19, Fujimori further discloses that the photovoltaic cell further comprises a second layer (barrier layer 8, fig. 2 or 7, both figs. are directed to first embodiment; ¶ 0056 and ¶ 0061) supported by the first layer, the second layer being planarized (see fig. 7 for planarized layer 8).

Regarding claim 20, Fujimori further discloses the substrate (2) is flexible (§ 0074).

8. Claims 1, 3, 4, 7, 9-11, 16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito et al. (JP 03-125480). Additional support is provided by Applicant's specification.

Regarding claims 1 and 3, Ito discloses an organic photovoltaic component (solar cell comprising organic semiconductor, i.e., silicon carbide; see abstract) comprising a substrate (glass substrate 1, fig. 2; see abstract), a positive electrode (ZnS film 2, fig. 2; see abstract), an organic semiconductor (silicon carbide 4 or 5 or 6, fig. 2; see abstract) and a negative electrode (Al electrode 7, fig. 2; see abstract; and Applicant's specification, page 2, paragraph 3), wherein the substrate (1) is structured (fig. 2 shows structured glass substrate). The claims are interpreted in light of the specification, and Applicant appears to desire a broad definition of the term "organic" (Page 3, § 4), and a silicon carbide is therefore considered to read on the organic semiconductor.

Regarding claim 4, Ito discloses a method for structuring the semiconductor layer (silicon carbide 4 or 5 or 6, fig. 2, see abstract) of a photovoltaic component (solar cell, see abstract) by preserving an existing structure of a lower layer (Cr electrode 3, fig. 2, see abstract) to which said semiconductor layer (4 or 5 or 6) is applied (see fig. 9).

Regarding claim 7, Ito discloses a photovoltaic cell (solar cell, see title), comprising:

- a substrate (glass substrate 1, fig. 2; see abstract);

- a first electrode (ZnS film 2, fig. 2; see abstract) supported by the substrate (1);
- a second electrode (Al electrode 7, fig. 2; see abstract);
- an organic semiconductor (silicon carbide 4 or 5 or 6, fig. 2; see abstract) between the positive (2) and negative electrodes (7), wherein the substrate (1) is structured (see fig. 2).

Regarding claim 9, Ito further discloses that the first electrode (2) is structured (see fig. 2 for structured portion of the electrode b).

Regarding claim 10, Ito further discloses that the first electrode (2) is disposed on the substrate (1, fig. 2 showing deposition of the first electrode on the substrate)

Regarding claim 11, Ito further discloses that the first electrode (2) is a cathode. Applicant discloses that anode is made of Al (specification, page 2, ¶ 3). Therefore, second electrode (7) is an anode, and first electrode (2) is inherently a cathode.

Regarding claim 16, Ito discloses a photovoltaic cell (solar cell, see abstract), comprising:

- a substrate (glass substrate 1, fig. 2; see abstract);
- a first electrode (ZnS film 2, fig. 2; see abstract) supported by the substrate (1);
- a second electrode (Al electrode 7, fig. 2; see abstract);
- an organic semiconductor (silicon carbide 4 or 5 or 6, fig. 2; see abstract) between the positive (2) and negative electrodes (7),

wherein the first electrode (2) is structured (see fig. 2 for structured configuration).

Regarding claim 18, Ito further discloses the photovoltaic cell further comprises a first layer (Cr electrode 3, fig. 2, abstract) supported by the first electrode, the additional layer (3) being structured (see fig. 2 for structured layer).

9. Claims 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Patent 6,291,763).

Regarding claim 16, Nakamura discloses a photovoltaic cell (photoelectric conversion device, see abstract), comprising:

- a substrate (bottom transparent substrate 13, fig. 2D; Col. 29, lines 62-67);
- a first electrode (bottom transparent conductor layer 12, fig. 2D; Col. 29, lines 62-67) supported (see fig. 2D) by the substrate (bottom transparent substrate 13);
- a second electrode (top transparent conductor layer 12, fig. 2D; Col. 29, lines 62-67);
- an organic semiconductor (dye-sensitized semiconductor layer 14, fig. 2D; Col. 29, lines 62-67) between the positive (first electrode) and negative electrodes (2nd electrode),

wherein the first electrode is structured (fig. 2D shows structured first electrode; Col. 29, lines 62-67).

The claims are interpreted in light of the specification, and Applicant appears to desire a broad definition of the term “organic” (Page 3, ¶ 4), and any one of the selected

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semiconductor (from Col. 4, lines 61-67) sensitized with a dye (Col. 7, line 66- Col. 8, line 29) is therefore considered to read on the organic semiconductor.

Regarding claim 17, Nakamura further discloses that the substrate (bottom transparent substrate 13) is not structured (see fig. 2D).

Regarding claim 18, Nakamura further discloses the photovoltaic cell further comprises a first layer (porous electron-conducting layer 11, fig. 2D; Col. 29, lines 62-67) supported by the first electrode (*the layer 11 is disposed on the first electrode 12, and therefore inherently is supported by the first electrode 12*) the additional layer (11) being structured (see fig. 2D for structured layer).

Regarding claim 19, Nakamura further discloses the photovoltaic cell further comprises a second layer (top transparent substrate 13) supported by the first layer (*the layer 13 is disposed on the layer 11, and therefore inherently is supported by layer 11*), the second layer (top substrate 13) being planarized (fig. 2D shows planarized top substrate 13) .

Regarding claim 20, Nakamura further discloses the substrate is flexible (Col. 6, lines 4-17; Col. 31, lines 41-45).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimori as applied to claim 7 above, and further in view of Nakamura.

Regarding claims 12 and 13, Fujimori discloses a photovoltaic cell (photoelectric conversion element, see title) addressing all the limitation of the instant claim 7, as addressed above.

Regarding claim 13, Fujimori also discloses that the first electrode is disposed on the substrate.

Fujimori, however, does not explicitly disclose whether the photovoltaic cell further comprise a planarized layer between the substrate and the first electrode.

Nakamura, as described above, teaches a photovoltaic cell (photoelectric conversion device, see title) wherein the cell comprises a planarized layer (metal mesh 9, fig 2B) between the substrate (transparent substrate 13, fig. 2B, Col. 29, lines 49-54) and first electrode (transparent conductor layer, 12, fig. 2B, Col. 29, lines 49-54). Nakamura uses the additional layer between the substrate (13) and the first electrode (12) because it allows for a decrease in the resistance of the transparent substrate (Col. 6, lines 22-26).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide a planarized layer between the substrate and electrode in the photovoltaic cell of Fujimori, because it allows for a decrease in the resistance of the transparent substrate, as taught by Nakamura.

13. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito as applied to claim 7 above, and further in view of Nakamura.

Regarding claims 12 and 13, Ito discloses a photovoltaic cell (solar cell, see title) addressing all the limitation of the instant claim 7, as addressed above.

Regarding claim 13, Ito also discloses that the first electrode is disposed on the substrate.

Ito, however, does not explicitly disclose whether the photovoltaic cell further comprise a planarized layer between the substrate and the first electrode.

Nakamura, as described above, teaches a photovoltaic cell (photoelectric conversion device, see title) wherein the cell comprises a planarized layer (metal mesh 9, fig 2B) between the substrate (transparent substrate 13, fig. 2B, Col. 29, lines 49-54) and first electrode (transparent conductor layer, 12, fig. 2B, Col. 29, lines 49-54). Nakamura uses the additional layer between the substrate (13) and the first electrode (12) because it allows for a decrease in the resistance of the transparent substrate (Col. 6, lines 22-26).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide a planarized layer of Nakamura between the

substrate and electrode of the photovoltaic cell of Ito, because it allows for a decrease in the resistance of the transparent substrate, as taught by Nakamura.

14. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito as applied to claim 7 above, and further in view of Fujimori.

Regarding claims 14 and 15, Ito discloses a photovoltaic cell (solar cell, see title) addressing all the limitation of the instant claim 7, as addressed above. Ito also discloses that the first electrode is disposed on the substrate.

Ito, however, does not explicitly disclose whether the photovoltaic cell further comprise a planarized layer between the organic semiconductor and the first electrode.

Fujimori discloses that a photovoltaic cell comprising a planarized layer (barrier layer 8, fig. 2, ¶ 0069; see also fig. 7 that explicitly shows the barrier layer is planarized) between the semiconductor (hole transport layer 5, fig. 2) and the first electrode (3, fig. 2). Fujimori uses a planarized layer between the organic semiconductor and the first electrode because it allows for a prevention means against short-circuiting (¶ 0083).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use a planarized layer of Fujimori in the photovoltaic cell of Ito between the organic semiconductor and the first electrode because it allows for a prevention means against short-circuiting, as taught by Fujimori.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP 2002-111017 discloses a photovoltaic component comprising structured substrate, negative and positive electrodes, and a semiconductor layer interspersed between positive and negative electrodes (see. fig. 1).

JP 07-66438 (listed in IDS) discloses a photovoltaic component comprising structured substrate, negative and positive electrodes, and a semiconductor layer interspersed between positive and negative electrodes (see fig. 4).

U.S. Patent 5,891,264 (listed in IDS) discloses an organic photovoltaic component comprising structured substrate, negative and positive electrodes, and a semiconductor layer interspersed between positive and negative electrodes (see. fig. 9).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571)270-5268. The examiner can normally be reached on Monday to Friday, 8 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JESSICA WARD can be reached on (571)272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./

Examiner, Art Unit 4132

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 4132